The Nepal Biogas Support Programme:
A Demonstration of Successful Capacity Building and Institutional Development to Meet Rural Energy Needs

Matthew S. Mendis

Alternative Energy Development, Inc.

Presented at:

Village Power 2000

5 December 2000

Washington, DC

Introduction

- The Nepal Biogas Support Programme (BSP) is a success model as a result of:
  - Understanding the actual needs of the rural population and working with them;
  - Developing an affordable indigenous technology and approach that meets the actual needs;
  - Making a long-term commitment and investment to meet the needs on a national level;
  - Effective working relationships between the donor, host government agencies, national financial institutions, private sector, NGOs and end-user;
  - Providing affordable financing for end-users.

Background

- Nepal - small landlocked country w/ GDP of $200 in 1995.
- Population of 25 million - 90% live in rural areas.
- Only 10% of households connected to the grid.
- Traditional fuels account for 88% of total energy consumption (72% wood and 16% dung).
- Use of traditional fuels is putting pressure on forest and land resources.

Biogas Technology

- Biogas, which is 60% methane, can be produced from animal dung, human excrement and other biomass waste through anaerobic fermentation.
- Biogas can be used for cooking to replace fuelwood and lighting to replace kerosene.
- The technology has been proven throughout the globe.
- Resulting slurry retains all the nutrients of the biomass.

Potential for Biogas in Nepal

- A biogas plant in Nepal for a family of 4-6 persons requires the output of at least 3+ head of cattle.
- Approximately 2.3 million rural households in Nepal have cattle.
- Biogas plants were considered technically feasible for at least 1.5 million of these households.

History of Biogas in Nepal

- First introduced on experimental basis in 1955.
- Govt. program launched in 1974.
- Govt. established the Gobar Gas Co. in 1977.
- Installation rate prior to 1985 ranged between 100 and 300 units per year.
- By 1990, less than 6,000 units were installed in Nepal representing only 0.4% of the technical potential.
- Many of the biogas plants were not fully functional or utilized.

Genesis of Biogas Support Program

- Netherlands DGIS recognized the need to support Nepal in its biogas program in late 1980s.
- In 1989 - posted an SNV staff to the GGC to provide technical assistance to improve design and reduce costs.
- In 1990 supported second SNV expert to try to reduce costs and improve performance further.
- Results were an improved design, reduced costs but still not sufficient to be financially viable for large scale dissemination w/o a subsidy.

Initiation of Nepal BSP

- The Nepal BSP was launched in July 1992 with support from Dutch Development Corporation.
- Project partners included Govt. of Nepal, Agricultrual Development Bank of Nepal (ADB/N) and SNV.
- Objective to install 7,000 systems by July 1994 - BSP I.
- Financial subsidy of approximately 25% of total cost was provided.

Continuation of BSP Support

- Second phase-BSP II- was initiated from July 1994 to July 1997.
- Objective
  - Construct another 13,000 plants;
  - Initiate strict quality control and standards;
  - Establish a base of trained technicians;
  - Make systems more attractive for smaller farmers;
  - Increase participation private sector participants;
  - Expand participation to other Banks;
  - Support establishment of coordinating apex body.
- BSP II achieved targets 6 months ahead of schedule.

Initiation of BSP III

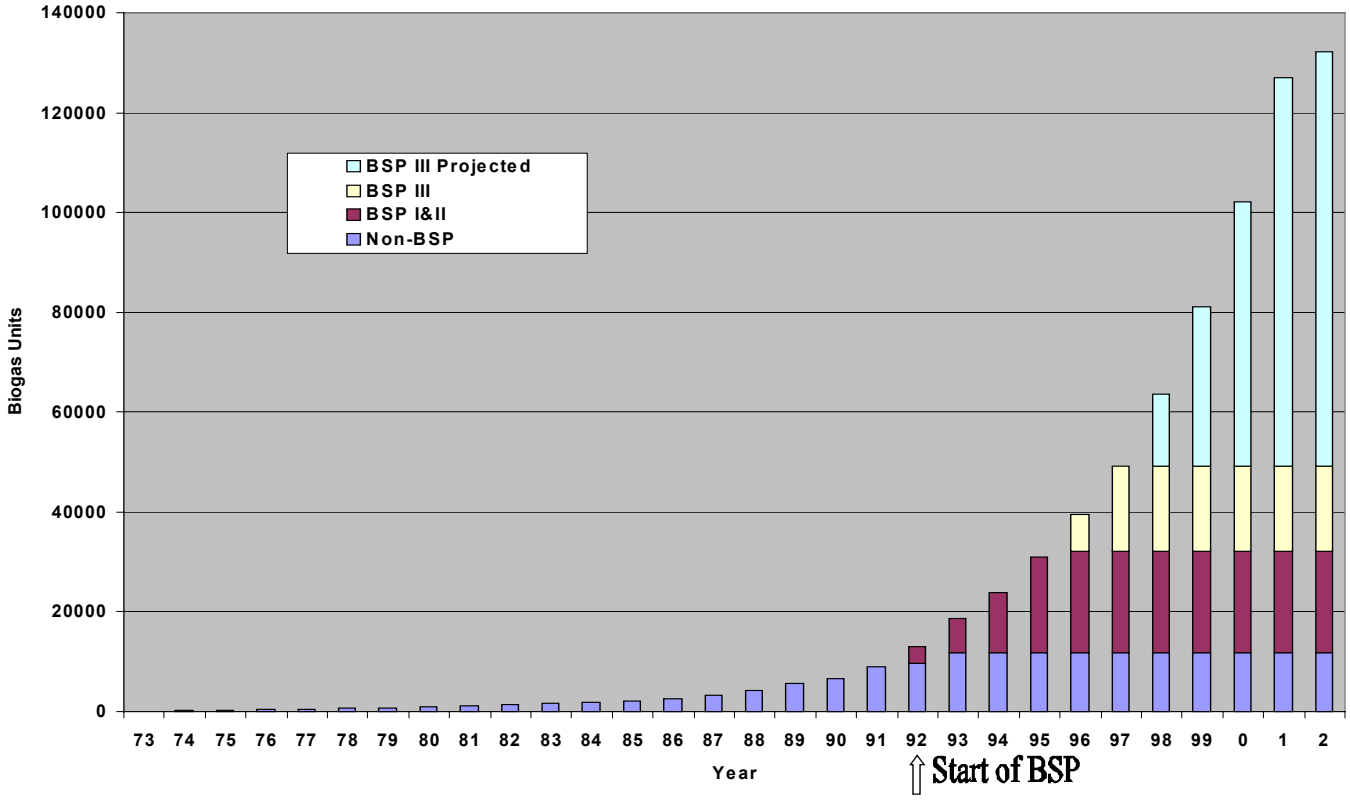
- Effective in March 1997 with objectives:
  - Develop a commercially viable, market-oriented biogas industry;
  - Increase the number of installed units to 100,000 units;
  - Support O&M of existing plants;
  - Establish and strengthen appropriate institutions to help continue and sustain the development of the biogas sector in Nepal;
  - Increase the number of private sector and NGO participants in the program;
  - Attract more sources of financing.

Achievements of BSP to Date

- By May 2000, approximately 65,000 biogas plants have been installed in Nepal.
- Production capacity has increased from 3,300 units/yr in 1992 to over 11,000 units/yr in 2000.
- Qualified firms offering the technology have grown from 1 in 1991 to 50 in 2000.
- Success rate of functioning plants has increased from 93% in 1994 to 98% in 2000.
- Number of local banks lending for biogas has gone from 1 in 1992 to 3 in 2000.
- BSP has attracted co-financing from KFW.

Cumulative Number of Biogas Plants Installed in Nepal

Figure 3: Cumulative Number of Biogas Plants Installed in Nepal



Success Factors

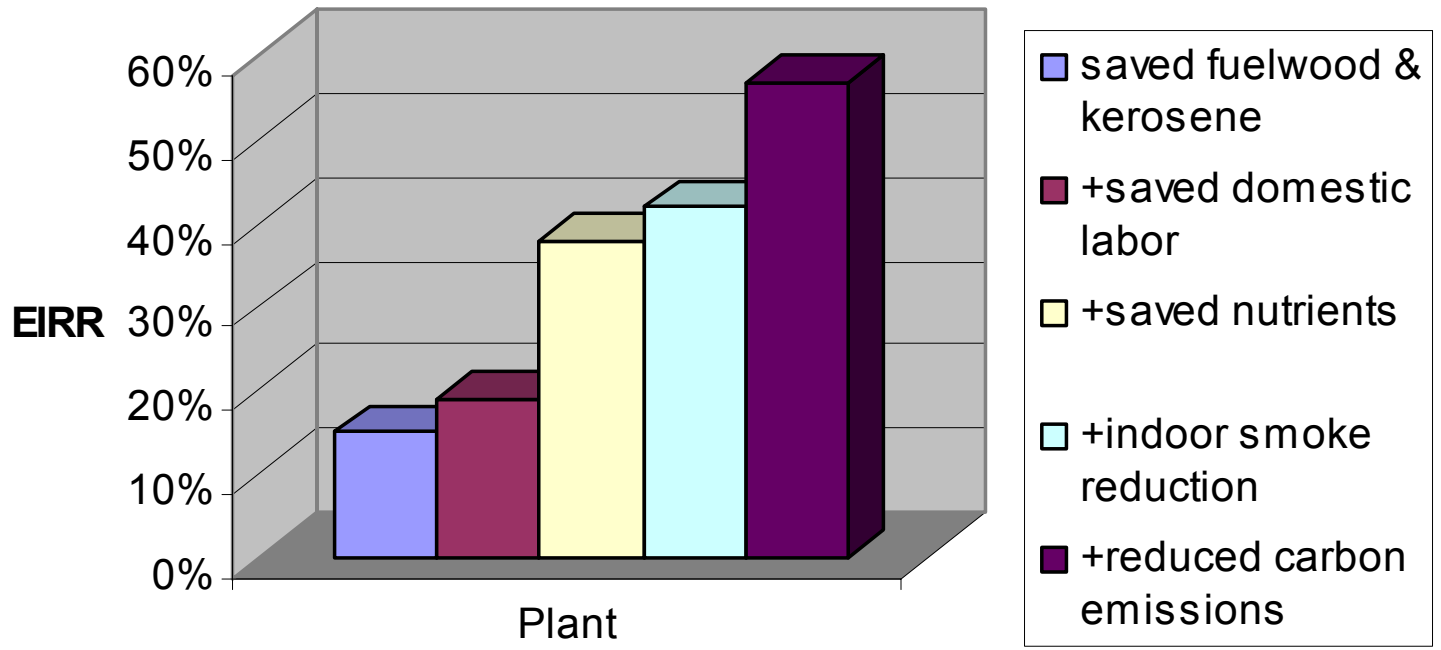
- Technical
  - Improved and more appropriate design;
  - Strict specifications and quality standards;
  - Training of construction technicians;
  - Certification and financial incentives for high quality systems.
- Institutional
  - Partnership with key institutional players;
  - Introduction/increase of private sector participation;
  - Active industry association to self police the industry;
- Financial
  - Uniform, transparent and direct financial incentives to consumers;
  - Smart subsidies.

Cost and Financing for BSP I & II

- Total expenditure for BSP I & II was $9.5 million.
  - Bank loans and cash payments = 55%
  - Investment subsidies = 33%
  - Technical assistance costs = 12%
- Total funding derived from
  - Nepalese banks = 43%
  - Dutch Development Corporation = 44%
  - Farmers equity = 12%
  - Suppliers fees = 1%

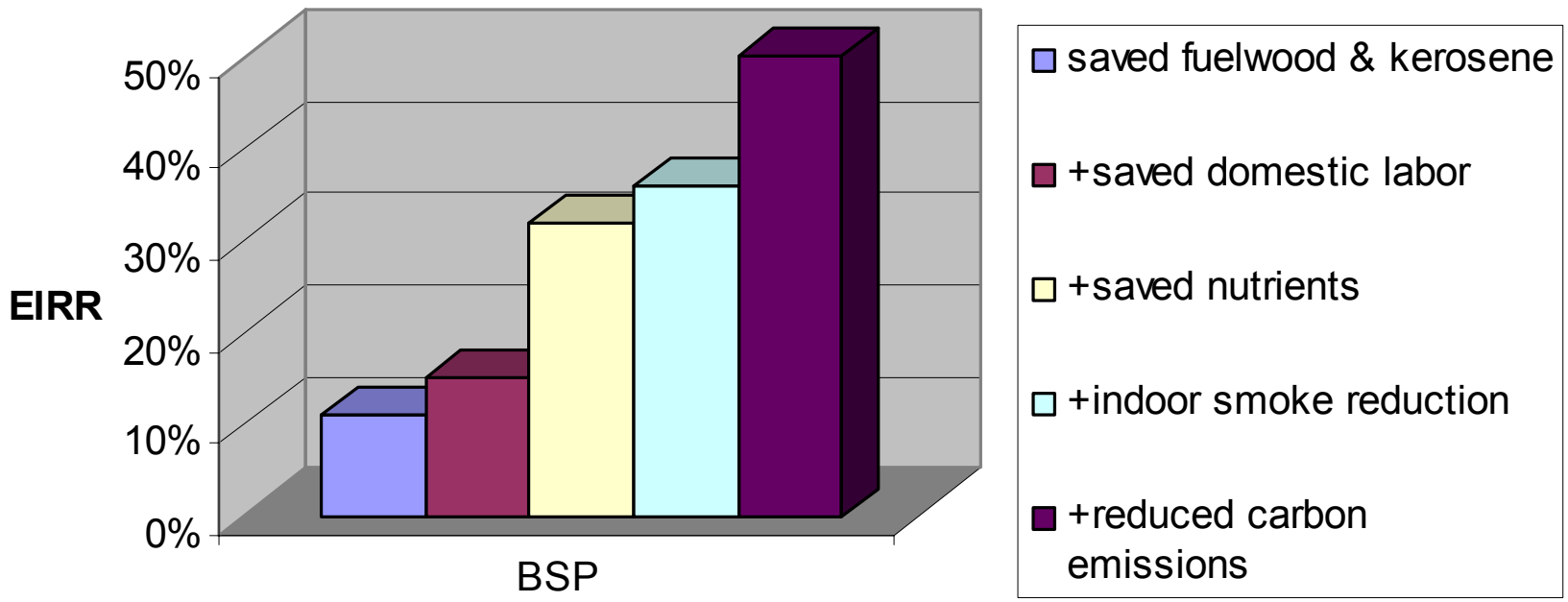
Economic Analysis of Biogas Plant

Figure 6: EIRR for Biogas Plant (8 m3)



Economic Analysis of BSP

Figure 7: EIRR for BSP



Benefits of the BSP

- Environmental benefits:
  - Improve indoor air quality;
  - Improved sanitary disposal of animal and human wastes
  - Reduced pressure on deforestation;
  - Reduced depletion of soil nutrients;
  - Reduced GHG emissions.
- Health benefits
- Gender benefits.

Lessons Learnt from the BSP

- Understand the end-user/market and design products that meet needs and addresses concerns.
- Identify the most appropriate cost-effective designs before a market launch.
- Establish and enforce solid design, quality and service criteria that will ensure reliable plants.
- Identify key institutional players and assist in strengthening their capacity.
- Secure the commitment and support of financial institutions for capital investment loans.

Lessons Learnt (continued)

- Identify the financial incentives needed to stimulate the market and attract qualified buyers.
- Design and apply uniform financial incentives in an easily administered and transparent manner.
- Ensure that financial incentives reach the target groups and are not diverted to manufacturers.
- Provide technical and management support to all key players.
- Maximize the use of programme resources for product support and market development.